

# Xiurui Zhao (赵修瑞)

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## Research Interests

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**Active Galactic Nuclei and Supermassive Black Holes, Extragalactic Survey**

## Appointments & Fellowships

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**California Institute of Technology, Pasadena, U.S.** **Oct 2024-**  
Visiting Scholar, Host: Prof. Fiona Harrison

**University of Illinois Urbana-Champaign, Urbana, U.S.** **Oct 2023-**  
Post-Doctoral Research Fellow, Advisor: Prof. Yue Shen

**Center for Astrophysics | Harvard & Smithsonian, Cambridge, U.S.** **Sep 2021-Jun 2023**  
Post-Doctoral Research Fellow, Advisors: Dr. Francesca Civano, Dr. Martin Elvis

**Center for Astrophysics | Harvard & Smithsonian, Cambridge, U.S.** **May 2020-May 2021**  
Pre-Doctoral Fellow, Advisor: Dr. Francesca Civano

## Education

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**Clemson University, Clemson, U.S.** **Aug 2016-Aug 2021**  
Ph.D. in Astrophysics, Advisor: Prof. Marco Ajello  
Dissertation: *Heavily Obscured Active Galactic Nuclei in NuSTAR Era*

**Lanzhou University, Lanzhou, China** **Sep 2012-Jun 2016**  
B.Sc. in Physics, Cuiying Honors College

## Honors and Awards

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Clemson University Outstanding Graduate Researcher Award (2 winners each year)	2021
Clemson Science College Outstanding Graduate in Discovery Award	2021
Clemson Physics Department Graduate Research Assistant Award	2021
SAO Predoctoral Fellowship	2020-2021
Clemson Graduate Student Travel Grant	2019, 2021
Cuiying Honors College Abroad Study Fellowship	2014, 2015

## Accepted Scientific Proposals as PI

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**18** accepted X-ray/optical/sub-mm proposals with **\$370k** grant as PI.

- **X-ray (1.6 Ms)**

- **NuSTAR** Cycle 9 (**Large**, 500 ks *NuSTAR* + 142 ks XMM, \$130k) **2023**  
*“Systematically Constraining the AGN Coronal Properties with NuSTAR Using a Sample of Luminous, High-redshift Quasars”*
- **NuSTAR** Cycle 8 (**Large**, 600 ks *NuSTAR* + 195 ks XMM, \$150k) **2022**  
*“Constraining the Properties of AGN Coronae using a Sample of Luminous, High-redshift Quasars with NuSTAR”*
- **NuSTAR** Cycle 7 (100 ks *NuSTAR* + 60 ks XMM, \$90k) **2021**  
*“Unveiling with NuSTAR the most powerful, heavily obscured, quasar ever discovered in X-rays”*
- **Swift**-XRT Cycle 19 (18 ks) **2022**  
*“Building with Swift/XRT a Sample of Luminous, High-redshift Quasars to Constrain the Properties of AGN Coronae”*
- **Swift**-XRT ToO (3 ks) **2021**  
*“Measure the X-ray flux of a rare coronal line event quasar exhibiting another optical flare”*

- **Optical (8.5 nights)**

- **SOAR** 4m Goodman (1 night) **2024B**  
*“Identify X-ray Bright Quasars to Constrain the AGN Coronae”*
- **BOK** 2.5m BCSpec (2 night), Co-PI **2024B**  
*“Redshifts of X-ray Bright Quasars to Constrain the AGN Corona”*
- **MMT** 6.5m Hectospec (0.3+0.3 night, 335 sources) **2022B & 2023A**  
*“Complete the Hectospec Spectroscopic Survey of JWST NEP Time-Domain-Field”*
- **MMT** 6.5m Binospec (0.1+0.1+0.2 night) **2022A & 2022B & 2023A**  
*Monitoring a Coronal Line Event AGN*
- **MMT** 6.5m Binospec (0.4 night, 6 sources) **2023A**  
*Identify X-ray Bright Quasars and Constrain the AGN Coronal*
- **SAO FLWO** 1.5m FAST (0.2 night) **2023A**  
*Measure the Black Hole Mass of an X-ray Bright Quasar to Constrain Its Coronal Properties*
- **SAO FLWO** 1.2m Keplercam (1+1+2 night, g, r, i) **2023A & 2022B & 2022A**  
*“Monitoring the Continuous Optical Flares of a Coronal Line Event”*

- **Sub-mm (3 tracks)**

- **Submillimeter Array** (SMA) standard science observation (3 tracks) **2022B**  
*“Monitoring with SMA a Highly Variable Flat Spectrum Radio Quasar in the JWST North Ecliptic Pole Time-Domain Field”*

## Collaboration & Professional Service

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- Core Member of **HEX-P** Black Hole Growth & Corona Working Group **2022-**
- Member of **JWST** PEARLS Working Group **2022-**
- Member of **NuSTAR** Extragalactic Survey Team **2020-**

- Member of *Athena* Science Working Group 2020-
- Co-organizers of CfA High Energy Astrophysics Division Seminar 2021-2023
- + Panelist for NASA *NuSTAR* Proposal Review
- + External reviewer for CFHT
- + Reviewer for ApJ, A&A

## Invited Talks

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Caltech, Tea Talk	<b>May 2024</b>
Caltech, HEA Group Meeting	<b>May 2024</b>
Zhejiang University, Colloquium	<b>Sep 2023</b>
Peking University, KIAA-DoA Seminar	<b>Aug 2023</b>
Tsinghua University, Departmental Seminar	<b>Aug 2023</b>
UIUC, local group meeting	<b>May 2023</b>
Yale University, Galaxy Lunch Talk	<b>Apr 2023</b>
MIT, Brown Bag Lunch Talk	<b>Apr 2023</b>
NASA GSFC, X-ray Astrophysics Laboratory AGN Seminar (Virtual)	<b>Feb 2023</b>
CfA, High Energy Seminar	<b>Feb 2023</b>
Arizona State University, Cosmology Seminar	<b>Dec 2022</b>
University of Arizona, Steward Observatory/NOIRLab Galaxy group seminar	<b>Dec 2022</b>
MIT, High Energy Astro Group seminar (Virtual)	<b>Apr 2022</b>
Clemson University, Local Group seminar	<b>Apr 2022</b>
INAF OAS, Bologna, X-ray group seminar	<b>Sep 2019</b>

## Conferences & Contributed Talks

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High Energy Astrophysics Division 21th Meeting ( <i>Contributed Talk</i> )	Texas, <b>Apr 2024</b>
243st AAS Meeting ( <i>Contributed Talk</i> )	New Orleans, <b>Jan 2024</b>
High Energy Astrophysics Division 20th Meeting ( <i>Contributed Talk</i> )	Waikōloa, <b>Mar 2023</b>
241st AAS Meeting ( <i>Contributed Talk</i> )	Seattle, <b>Jan 2023</b>
<i>NuSTAR</i> 2022 Conference ( <i>Contributed Talk</i> )	Italy, <b>June 2022</b>
New England Regional Quasar and AGN Meeting ( <i>Contributed Talk</i> )	Storrs, <b>May 2022</b>
High Energy Astrophysics Division 19th Meeting ( <i>Poster</i> )	Pittsburgh, <b>Mar 2022</b>
Black Hole Across Space and Time ( <i>Contributed Talk</i> )	Virtual, <b>Dec 2021</b>
238th AAS Meeting ( <i>Dissertation Talk</i> )	Virtual, <b>June 2021</b>
237th AAS Meeting ( <i>Contributed Talk</i> )	Virtual, <b>Jan 2021</b>
Supermassive Black Holes Meeting ( <i>Contributed Talk</i> )	Virtual, <b>Dec 2020</b>
235th AAS Meeting ( <i>Contributed Talk</i> )	Honolulu, <b>Jan 2020</b>
X-ray Astronomy 2019 Meeting ( <i>Poster</i> )	Bologna, Italy, <b>Sep 2019</b>
High Energy Astrophysics Division 17th Meeting ( <i>Poster</i> )	Monterey, <b>Mar 2019</b>

## Mentoring & Assistant Experience

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Co-supervision of Clemson graduate student R. Silver	2019-
Co-supervision of Clemson graduate student A. Pizzetti	2019-2024
Co-supervision of Clemson undergraduate students D. Cole and Z. Hu	2019
Research Assistant, Clemson	2018-2020
Teaching Assistant (PHYS 2230), Clemson	2016-2017

## Workshops & Schools

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CSST summer school at Peking University	Beijing, China, <b>July 2023</b>
Summer School for Astrostatistics at Penn State	State College, <b>Jun 2023</b>
End-to-end Simulations with SIXTE Workshop	Virtual, <b>Mar 2022</b>
2022 Submillimeter Array Interferometry School	Virtual, <b>Jan 2022</b>
Winter School at University of Freiburg	Freiburg, Germany, <b>Feb 2015</b>
Summer School at University of California, Berkeley	Berkeley, <b>Jun-July 2014</b>

## Press Release

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Webb Glimpses Field of Extragalactic PEARLS, Studded With Galactic Diamonds	<b>2022</b>
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## Outreach & DEI

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- The Silk Road Cameleers Series (Introduce AGN to Undergrads) Remote, **Apr, 2024**
- † Volunteer to teach astronomy and mathematics to elemental and high school students in the rural area of China Qiajia, **Summer, 2023**
- † Translate Sensing Dynamic Universe project into Chinese (help people with visual disability accessible to the dynamic Universe with sonified astromical light curves and spectra) **2022-2023**

## Reference

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- Marco Ajello, PhD supervisor, [majello@g.clemson.edu](mailto:majello@g.clemson.edu)
- Francesca Civano, postdoc supervisor, [francesca.m.civano@nasa.gov](mailto:francesca.m.civano@nasa.gov)
- Yue Shen, postdoc supervisor, [shenyue@illinois.edu](mailto:shenyue@illinois.edu)
- Martin Elvis, postdoc co-supervisor, [melvis@cfa.harvard.edu](mailto:melvis@cfa.harvard.edu)
- Stefano Marchesi, PhD co-supervisor, [stefano.marchesi@inaf.it](mailto:stefano.marchesi@inaf.it)

## Publication List

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A total of **30** peer-reviewed papers, **2** submitted papers [ADS](#)

### - **First-author papers**

- 7) **X. Zhao**, S. Marchesi, M. Ajello et al., 2024, ApJ, 975, 24  
*An X-ray Significantly Variable, Luminous, Type 2 Quasar at  $z = 2.99$  with a Massive Host Galaxy*
- 6) **X. Zhao**, F. Civano, C. N. A. Willmer et al., 2024, ApJ, 965, 188  
*PEARLS: The NuSTAR and XMM-Newton extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field II*
- 5) **X. Zhao**, F. Civano, F. M. Fornasini, et al. 2021, MNRAS, 508, 5176  
*The NuSTAR extragalactic surveys of the JWST North Ecliptic pole Time-Domain Field*
- 4) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2021, A&A, 650, A57  
*The properties of the AGN torus as revealed from a set of unbiased NuSTAR observations*
- 3) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2020, ApJ, 894, 71  
*A broadband X-ray study of a sample of AGNs with [OIII] measured inclinations*
- 2) **X. Zhao**, S. Marchesi, M. Ajello, 2019, ApJ, 871, 182  
*Compton-thick AGN in the NuSTAR Era. IV. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in ESO 116-G018*
- 1) **X. Zhao**, S. Marchesi, M. Ajello, et al. 2019, ApJ, 870, 60  
*Compton-thick AGNs in the NuSTAR Era. II. A Deep NuSTAR and XMM-Newton View of the Candidate Compton-thick AGN in NGC 1358*

### - **Second/Third author or significantly contributed papers**

- 10) F. Civano, **X. Zhao**, P. Boorman, et al., 2024, Front. Astron. Space Sci., 1340719  
*The High Energy X-ray Probe (HEX-P): X-ray population contributing to peak of the Cosmic X-ray background*
- 9) E. Kammoun, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1308056  
*The High Energy X-ray Probe (HEX-P): Probing the physics of X-ray corona in active galactic nuclei*
- 8) N. Torres-Albà, M. Stefano, **X. Zhao**, et al., 2023, A&A, 678, A154  
*Hydrogen Column Density Variability in a sample of local Compton-thin AGN*
- 7) R. Silver, N. Torres-Albà, **X. Zhao**, et al., 2023, A&A, 675, A65  
*A New Mid-Infrared and X-ray Machine Learning Algorithm to Discover Compton-thick AGN*
- 6) R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, ApJ, 940, 148  
*Compton-thick AGN in NuSTAR Era. IX: joint NuSTAR and XMM-Newton analysis of four local AGN*
- 5) S. Marchesi, **X. Zhao**, N. Torres-Albà, et al. 2022, ApJ, 935, 114  
*Compton-Thick AGN in the NuSTAR era VIII: A joint NuSTAR-XMM-Newton monitoring of the changing-look Compton-thick AGN NGC 1358*
- 4) R. Silver, N. Torres-Albà, **X. Zhao**, et al. 2022, ApJ, 932, 43  
*Chandra Follow-up Observations of Swift-BAT-selected AGNs II*
- 3) N. Torres-Albà, S. Marchesi, **X. Zhao**, et al. 2021, ApJ, 922, 252

- 2) S. Marchesi, M. Ajello, **X. Zhao**, et al. 2019, ApJ, 882, 162  
*Compton-thick AGNs in the NuSTAR Era. V. Joint NuSTAR and XMM-Newton Spectral Analysis of Three “Soft-gamma” Candidate CT-AGNs in the Swift/BAT 100-month Catalog*

- 1) S. Marchesi, M. Ajello, **X. Zhao**, et al. 2019, ApJ, 872, 8  
*Compton-thick AGNs in the NuSTAR Era. III. A Systematic Study of the Torus Covering Factor*

- **Co-author papers**

- 15) I. Cox, et al. (including **X. Zhao**), Submitted to AAS journals  
*Chandra Follow-up Observations of Swift-BAT-Selected AGNs III*
- 14) D. Sengupta, et al. (including **X. Zhao**), Submitted to A&A  
*A Multi-Wavelength Characterization of the Obscuring Medium at the Center of NGC 6300*
- 13) J. García, et al. (including **X. Zhao**), Accepted to Front. Astron. Space Sci.  
*The High Energy X-ray Probe (HEX-P): Science Overview*
- 12) A. Pizzetti, et al. (including **X. Zhao**), Accepted to AAS journals  
*Hydrogen column density variability in a sample of local Compton-thin AGN II*
- 11) N. S. Khatiya, et al. (including **X. Zhao**), 2024, ApJ, 971, 84  
*Characterizing the  $\gamma$ -ray Emission from FR0 Radio Galaxies*
- 10) R O'Brien, et al. (including **X. Zhao**), 2024, ApJS, 272, 19  
*TREASUREHUNT: Transients and Variability Discovered with HST in the JWST North Ecliptic Pole Time Domain Field*
- 9) P. Boorman, et al. (including **X. Zhao**), 2024, Front. Astron. Space Sci., 1335459  
*The High Energy X-ray Probe (HEX-P): Probing the circum-nuclear environment in AGN down to extremely low luminosities*
- 8) I. Cox, et al. (including **X. Zhao**), 2023, ApJ, 958, 155  
*A simple method to predict  $N_H$  variability in active galactic nuclei*
- 7) S. P. Willner, et al. (including **X. Zhao**), 2023, ApJ, 958, 176  
*PEARLS: JWST counterparts of micro-Jy radio sources in the Time Domain field*
- 6) C. N. A. Willmer, et al. (including **X. Zhao**), 2023, ApJS, 269, 21  
*PEARLS: Near Infrared Photometry in the JWST North Ecliptic Pole Time Domain Field*
- 5) Q. Yang, et al. (including **X. Zhao**), 2023, ApJ, 953, 61  
*Probing the Origin of Changing-look Quasar Transitions with Chandra*
- 4) D. Sengupta, et al. (including **X. Zhao**), 2023, A&A, 676, A103  
*Compton-thick AGN in the NuSTAR Era IX: Analysis of seven local CT-AGN candidates*
- 3) R. A. Windhorst, et al. (including **X. Zhao**), 2023, AJ, 165, 13  
*Webb’s PEARLS: Prime Extragalactic Areas for Reionization and Lensing Science: Project Overview and First Results*
- 2) A. Pizzetti, et al. (including **X. Zhao**), 2022, ApJ, 936, 149  
*A multi-epoch X-ray study of the nearby Seyfert 2 galaxy NGC 7479: Linking column density variability to the torus geometry*

- 1) A. Traina, et al. (including **X. Zhao**), 2021, ApJ, 922, 159  
*Compton-Thick AGN in the NuSTAR era VII: a joint NuSTAR, Chandra and XMM-Newton analysis of two nearby, heavily obscured sources*